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REV. 1/63

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PROGRESS REPORT

ENGINEERING DEPARTMENT

ORGANIC CHEMICALS DIVISION

JOB NUMBER
EA 4-455

REPORT NUMBER
4

DATE
May 4, 1964

ENGINEERING DEPARTMENT		GENERAL OFFICES	RESEARCH	OTHERS
☐ W.G. ADAMS	☐ J. D. KNOX	☐ R. E. BILGER	☐ C.E. ANAGNOSTOPOULOS	☐ J. E. SMITH - JFQ
☐ J. P. BUFE	☐ M.P. LUX	☐ J. R. DURLAND	☐ O. DE GARMO	☒ J. A. MULLENDORE-WGK
☒ F. W. ENOCH	☐ J. W. MASHEK	☐ H. A. HASHBARGER	☐ M. W. FARRAR	☐ W. S. HINCHCLIFF-NITRO
☐ L. L. FELLINGER	☐ J. F. NEFF	☒ D. S. HOSMER	☐ H. W. FAUST	☐ H. W. KILBOURNE-NITRO
☒ F. J. HOLZAPFEL*	☐ R. L. SANDSTEDT	☐ L. E. KLEIN	☐ H. L. HUBBARD	x R.H.Spuering *
☐ R. E. HOWARD	☐ R. F. SEIFERT	☐ P. E. MC INTYRE	☐ T. M. PATRICK	x R.B.Hodges *
☒ Circ.Proj.Mgrs	☐ R. P. STEVENS	☐ R. L. MILLER	☐ W. R. RICHARD	x G.A.Hippe
☐	☐	☒ H. L. MINCKLER	☐ T. P. SANDS	x R.E.Soden
☐	☐	☒ R. M. MORRIS	☐ F. B. ZIENTY	x L.W.Sprandel*
☐	☐	☐ N. L. SAMPLE	☐	x W.Prastka
☐	☐	☐ R. S. WOBUS	☐	x E.Fields
☐	☐		☐	x L.D.McCoy

*** To Receive Details Section**

TITLE: Long Range Sewer Plan - WGK Plant
Part IV - Proposed new trunk sewers for WGK Plant

PERSONNEL: J.W.Caskey, C.N.Stutz (R. E. Howard)

PROBLEM: To determine where new trunk sewers are required to serve the present plant and future expansion needs.

SUMMARY: Proposed trunk sewers are shown on page 6.

Long Range Sewer Plan - WGK
Plant Part IV, 5-4-64

WGK 4064906

Background

The Monsanto owned property in Monsanto, Illinois has been divided into drainage areas for study of the long range sewer needs. These areas are shown on the map, page 6. Drainage areas #1, 5, 6, & 7 are not now served by plant sewers.

Unit hydraulic loadings were developed in Report # 3, EA # 4-455 for use in analysis of present and future trunk sewers. The object of this report is to indicate where new trunk sewers are needed and the size required.

Basis of Calculations

Hydraulics in the Village sewer system are based on the same sewer conditions used in Report # 5, EA # 4-276. The flow distribution to the sewers along Monsanto Avenue and in the south WGK plant has been adjusted to reflect the proposed trunk sewer additions. The flow from the Mississippi Ave. system has not been changed. The hydraulic grade line (HGL) elevations of 394.0 at the pump station, 407.0 at manhole (MH) # 9, and 402.8 at Dead Creek are consistent with those in Report # 1, EA # 4-455.

Pond requirements are based on ponding the runoff from a five year frequency storm yielding a CI factor of 0.5 CFS per acre for three hours. This runoff causes the maximum depth expected from a five year storm, which corresponds to the maximum depths given in Report # 5, EA # 4-276 and Report # 1, EA # 4-455.

Sewers were sized so that the HGL at the upper end of the sewer would be within one to two feet of the ground surface during the design storm. The grades shown on proposed sewers are generally minimum grades, and provide velocities of between two and three feet per second when the sewer is flowing full.

Village Sewer System

The flows on page 7 were used to develop the future HGL's shown on pages 8 and 9. A present HGL from Report # 5, EA # 4-276 is shown for comparison.

At a water surface elevation of 407.0, the 19th St. pond in the future will require storage capacity up to 9.7 acre feet, based on 47 acres from area # 1 and 16.3 CFS (7300 gpm) from Socony. The present two acre pond, with four foot depth below elevation 407.0 can store the runoff from about 32 acres of area # 1, plus 16.3 CFS from Socony, when clean.

The future HGL along Monsanto Ave. is shown higher than the present HGL. This is primarily due to the new flow from area # 1. The future HGL in the south WGK area is higher than the present HGL shown. This is due to redistribution of flows and an overflow connection from MH # 26 to Dead Creek instead of from MH # 24.

The 402.8 water surface elevation shown in Dead Creek represents 24 acre feet of storage. This is equivalent to the drainage from 192 acres. The present runoff to Dead Creek is equivalent to the drainage from 120 acres.

Development of the entire south WGK plant by building the proposed sewers would cause a tributary area of about 143 acres plus 6 CFS from the Village residential area, which requires 19.2 acre feet of storage. This would cause a depth of 3.2 feet in the present pond and result in a water surface elevation of 402.0. Therefore, if the proposed overflow were built to Dead Creek, the HGL at MH # 26 would be lower than either profile shows, until additional area along Dead Creek is developed and the storm runoff directed to the creek.

The profiles and flow sheet for the Village sewers do not consider any flow from area # 6. As the area is developed, it will eventually become necessary to add sewer capacity from MH # 2 to the pump station.

Addition of the two 36" sewers shown on the map would allow about 76 CFS of water to enter the system at MH # 2 without raising the HGL at MH # 2 above 396.0. This is considered adequate.

Area # 1

The sewers shown in profile on pages 10 through 12 are sized to carry 2.0 CFS per acre. Dry weather flow will flow to MH # 8A on the Village system. During time of storm, the sewer system will relieve to the 19th St. pond. Future ground elevation in this area should slope from 411 on the west to 410 adjacent to 19th St.

98.64 WGK 97.64 WG.K

Area # 2

A profile of the proposed rectangular, storm water trench system is shown on page 13. The system is designed to carry 1.5 CFS per acre and discharge to a seepage pond in the north end of the area.

? McCoy

Eventually, a sewer will be required to carry the storm runoff from this area to the East Side Levee and Sanitary District sewer located north of the Illinois Central tracks. Industrial wastes will continue to go to the Village sewer system along Monsanto Avenue.

WGK 4064908

Area # 3

East of Falling Springs Road

Some of the existing sewers in the east portion of area # 3 will not carry the expected flows of 2.5 CFS per acre. Additional capacity is required along Third St. and "C" St. to maintain a favorable HGL elevation in the eastern portions of building Block # 1, # 2, # 3, and # 4. The present 36" sewer is adequate to serve the area if the proposed sewers shown in profile on page 14 are added. As discussed earlier, a more favorable HGL may be obtained by providing overflow capacity from MH # 26 to Dead Creek.

West of Falling Springs Road

The existing sewers in the west portion of area # 3 are inadequate to handle expected flows. Additional capacity is required to carry the flow from the northern portions of the area. The sewers shown in profile on page 15 were designed to carry 1.22 CFS per acre from building blocks # 7, # 11, and # 13 and 2.5 CFS per acre from the remaining area. The proposed sewer is sized large enough so that the 24" and 18" sewers through Block # 8, which are located under buildings, may be abandoned should this become necessary.

Area # 4

The present trunk sewers serving this area are adequate for anticipated present and future flows.

Area # 5

The proposed trunk sewers shown in profile on page 16 are based on flows of 2.5 CFS per acre. The 24" sewer between 2nd and 3rd streets is based on minimum future ground elevations of 408.0 in building blocks # 21, # 22, and # 25.

Area # 6

Proposed trunk sewers for area # 6, shown in profile on pages 17 and 18, are based on 2.0 CFS/acre. The initial box sections are placed low enough to intercept the present Village sewers, should it ever be desirable to remove the present Village sewers from service in order to utilize the land to better advantage. It should be noted that as area # 6 is developed, it will eventually become necessary to provide additional capacity between MH # 2 and the pump station to maintain present HGL elevations.

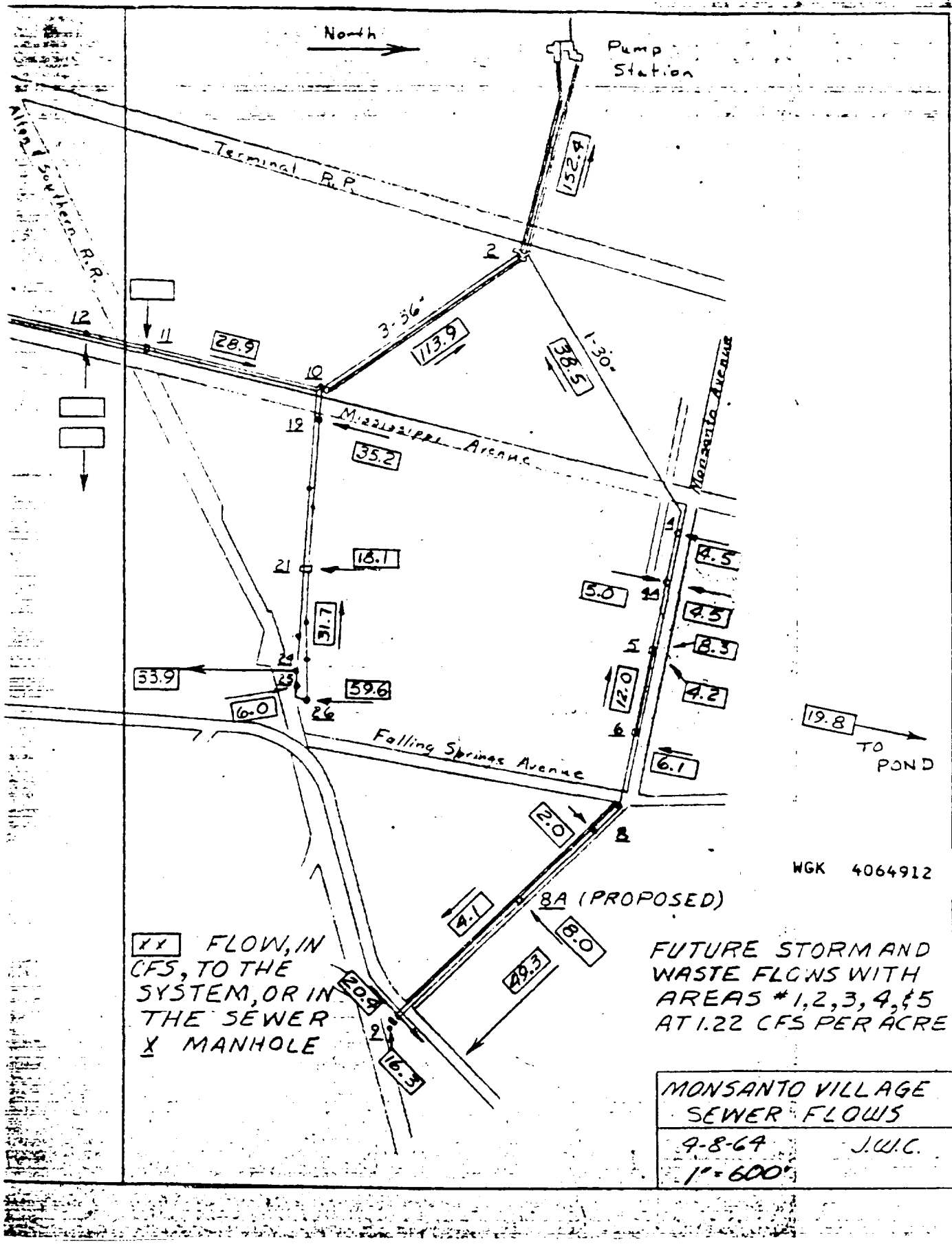
WGK 4064909

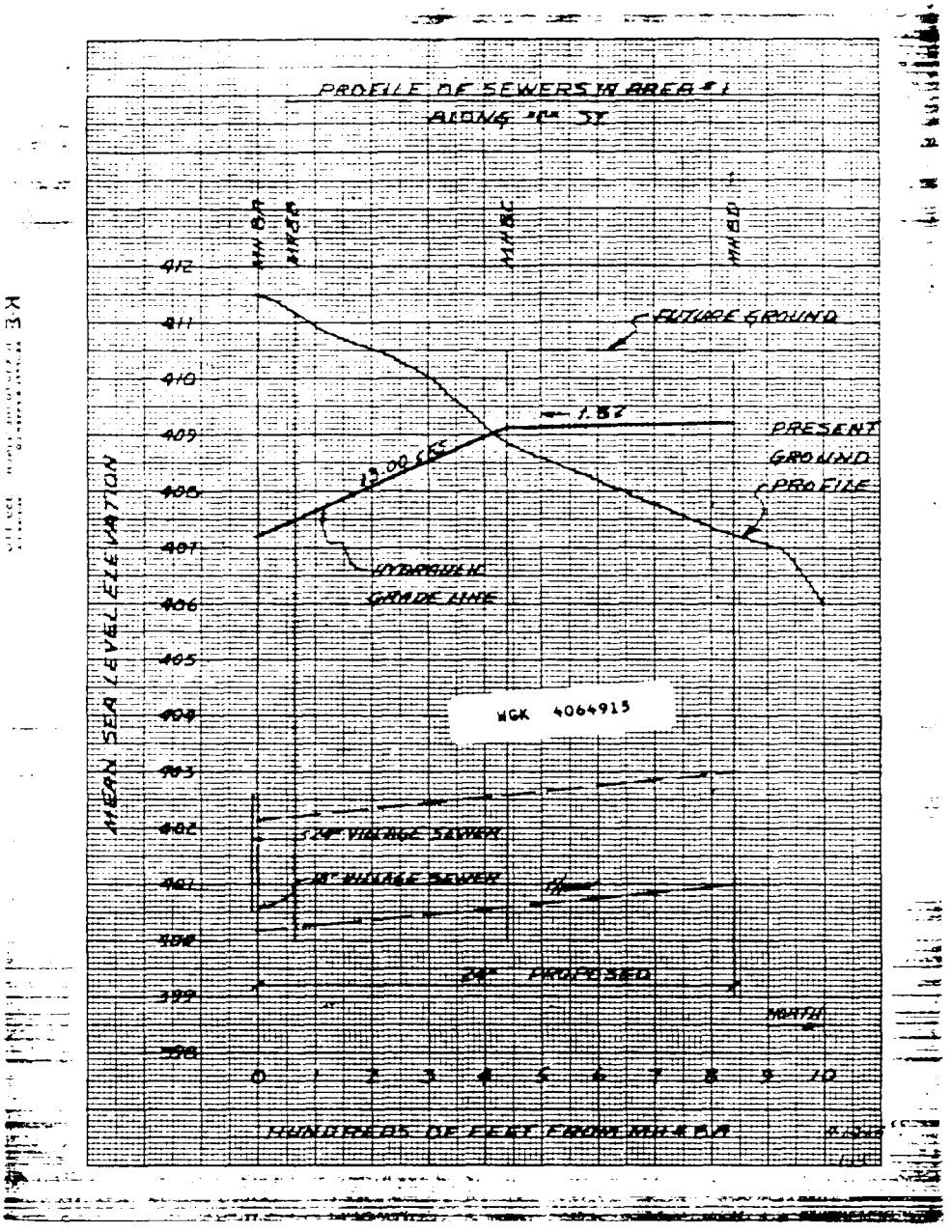
Area # 7

The sewer shown for area # 7, on page 19 , is sized on the basis of carrying waste water only. No HGL is shown, because the sewer will not be surcharged under anticipated waste flows. Any storm water facilities necessary should be drained directly to the river and not connected to the waste sewer system.

J. W. Caskey

pat
att.

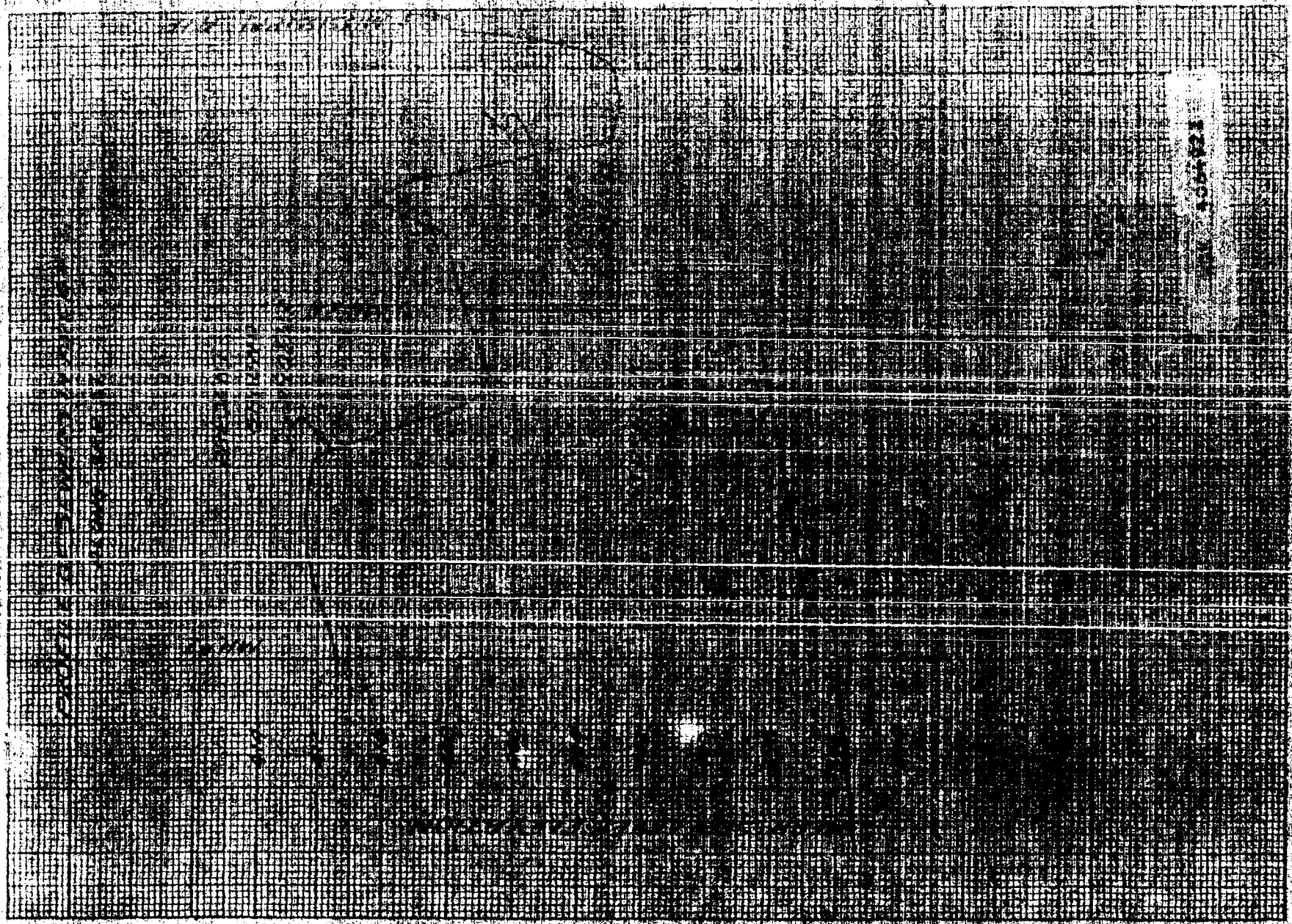




PROFILE OF SEWERS IN AREA "1
ALONG N. 2ND ST.
MEAN SEA LEVEL ELEVATION
MH 86
MH 85
MH 84
MH 83
MH 82
MH 81
19TH STREET
MH 87
FUTURE GROUND
6.50 CFS
13.10'
20.00
36.10
35.96
41.3
HYDRAULIC GRADE LINE
PRESENT GROUND PROFILE
MAXIMUM DEPTH IN POND
FUTURE POND BOTTOM
1%000'
1%000'
1%000'
24"
30"
36"
36"
36"
36"
PROPOSED SEWERS
WGK 4064917
WEST OF "C" ST.
EAST OF "C" ST.
HUNDREDS OF FEET

PROFILE OF STORM WATER TRENCHES IN AREA # 2

EPA / CERRO COPPER / ELF
ATTORNEY WORK PROCUCT
ATTORNEY CLIENT PRIVILEGE



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Monsanto

Capital Appropriation Request

NUMBER: CEA-3808

DATE: June 23, 1983

PAGE 1 OF 10

ORGANIZATION: MONSANTO INDUSTRIAL CHEMICALS COMPANY

PROJECT TITLE: W. G. KRUMMRICH, MAIN SOUTH TRUNK SEWER

Project Classification: Support Facilities - Services

Date of Project Initiation Request Submission: October 15, 1982

Required Approval Level: Board ☐ CEO ☐ President ☒

FINANCIAL SUMMARY

	($k)
New Fixed Capital:	$ 5,000
Allocated Capital	$ -
Maximum Working Capital:	$ -
Maximum Total Capital:	$ 5,000
Internal Rate of Return:	Support Project Percent
Net Present Value (14%)	$-2,602
Average Return on Capital (ROC):	NA Percent
Payout Period:	NA Years
Project Life	5 Years

CER 077437

Submitted by: L. J. Boesch, General Manager, Mfg. — 6/23/83 Date

R. G. Potter, Group Vice Pres., MIC — 6/27/83 Date

7/12/83 Date

Authorization: R. J. Mahoney, President — 7/12/83 Date

A1167 (REV. 4/81)

Monsanto

Capital Appropriation Request

NUMBER: CEA-3808

DATE: June 23, 1983

ORGANIZATION: MONSANTO INDUSTRIAL CHEMICALS COMPANY

PROJECT TITLE: W. G. KRUMMRICH, MAIN SOUTH TRUNK SEWER

PROJECT SUMMMARY

This Project

This $5.0M support project will provide a new 42-inch diameter Monsanto-owned in-plant trunk sewer to carry all the W. G. Krummrich plant sewer load now carried by two Village of Sauget-owned sewers. The two Village sewers are in a very deteriorated condition due to age (51 and 37 years old).

It is more cost effective for Monsanto to replace these sewers than the Village of Sauget. However, to minimize our environmental liability risk and the capital on which the plant must earn a return, we have obtained a letter of intent by the Village of Sauget to enter into an agreement with Monsanto to: a) hold harmless and indemnify Monsanto for liabilities, claims, costs or suits arising out of Village sewer use and b) to donate the sewer to Sauget five years after project completion. At that time the Village will assume total maintenance cost responsibility. This approach has been reviewed by Monsanto's Environmental, Treasury, Legal, and Tax departments. It is the consensus that this is the optimum cash flow approach for this project.

Alternatives

The following alternatives were considered:

1. Do nothing - Not feasible due to the continuing deterioration of the mains. As sewer lines and boxes fail, cave-ins occur which cause high maintenance costs and could result in sewer blockage and subsequent plant outage.

2. Repair existing mains for present type service - Not feasible or practical as such repairs could not withstand the acid and organic service for more than a few years at best. Further, the cost to Monsanto would be at least as much as the proposed project as temporary diverting sewer sections would have to be installed to permit repairs.

3. Village to fund and install this project- This alternative is not cost effective as it is estimated that it would cost the Village $2-3M more to install this project due to less effective project control than Monsanto. Because the Krummrich plant is the major user of the sewer, Monsanto could expect to pay the majority (about 75%) of the cost through taxes. Further, Monsanto's expenditures would still be treated as capital, not expense.

Economics

This $5.0M project qualifies for the investment tax credit and five-year accelerated depreciation for tax purposes. Although its normal life expectancy is about twenty-five years, the project would be set up on a five-year book depreciation to avoid write-off of any undepreciated asset at the time the sewer is donated to the Village.

Dismantling costs of $77k for roads, asphalt, curbing, and a 36-inch sewer line have been included in the economics of this project. A $62k gross asset retirement request with a retirement loss of $29k will be submitted to the W. G. Krummrich plant manager upon approval of this project. No obsolescence expense was budgeted for this Project.

The project will be financed through Industrial Revenue Bonds currently yielding about 9% on a long term issue.

Legal

A letter of intent has been signed by the Village of Sauget to enter into an agreement between Monsanto and the Village of Sauget providing that five years after the sewer is completed and placed in operation by Monsanto, Monsanto shall donate the sewer to the Village and the Village shall accept such donation along with the grant of a non-exclusive easement for purposes of use and maintenance. The proposed agreement contains suitable indemnification provisions. By execution of this Capital Appropriation Request, R. J. Mahoney, President, hereby delegates to the Group Vice President and Managing Director, MIC and his delegatees

authority to execute and deliver in the name of and on behalf of Monsanto Company, any contracts, agreements, deeds, instruments and documents and to do or cause to be done all such further acts and things as are deemed necessary or desirable to carry out and complete the sewer project and donation to the Village described herein.

Project Scope

The new sewer within plant boundary limits will, in general, be parallel to the two existing Village south trunk sewers. It will be about 1660 feet in length and carry 95% of the plant's sewer load. The new 42-inch sewer will have 40% more capacity than the present Village sewers. Several smaller branch sewers are needed to tie into existing sewers. The new sewer will combine south plant sewer loads into a single discharge point where sampling and measuring devices will be provided. The exceptions are sulfuric acid manufacturing, the laboratory, and Lot A which discharge into the Village sewer on the north side of the plant.

The existing south plant sewer system has nineteen discharge points into the Village sewer. A crossflow sewer line between the existing south trunk sewers and the new sewer main will be provided. This will allow diversion of the Village municipal and other industrial effluents while repairs are made to one of the existing sewer mains. Monsanto will continue to share in the repair cost to existing Village sewers.

To reduce construction costs, soil dewatering pumps will be operated and maintained by the plant rather than the sewer contractor. The wells will be installed after appropriate soil testing and dewatering studies, but prior to work by the contractor.

The capital estimate of $5.0M is considered accurate to ± 15% and is based on outside lump sum construction contracts. Assuming approval in June, 1983, mechanical completion will occur in March, 1985. Major elements of the project are:

Monsanto

Capital Appropriation Request

NUMBER: CEA-3808

DATE: June 23, 1983

ORGANIZATION: MONSANTO INDUSTRIAL CHEMICALS COMPANY

PROJECT TITLE: W. G. KRUMMRICH, MAIN SOUTH TRUNK SEWER

1.	Lump-sum bids for construction (including installation of dewatering wells).	$ 3,780k
2.	Engineering, contingencies, and indirects	$ 1,100k
3.	Plant labor to operate and maintain dewatering pumps	$ 100k
4.	Effluent flow monitoring and sampling equipment	$ 20k

Risk/Vulnerability

This project is considered vulnerable to capital and expense deviations. Deep excavations will be subject to flooding due to high ground water levels. Unstable soils require extensive shoring. Construction is very close to existing structures, and an unknown quantity of soil may be contaminated.

Extensive use of dewatering wells is planned to control ground water. The use of plant forces to operate and maintain the dewatering wells minimizes cost but increases the risk of a major overrun if the contractor manpower is required. No allowance is included in the AR estimate for this risk which could escalate costs as much as $1000k should we fail to get union agreement.

Actions taken to reduce the above risk include:

1. During discussions with the trade unions about plant management of dewatering wells for CEA 3741, ACL Waste Pre-Treatment, we also discussed our plans to install and operate our own dewatering wells for this sewer project. The unions have given approval of this strategy for ACL and we expect the same for this project.

2. Dewatering wells will be installed under separate contract prior to start of sewer construction to minimize potential union conflict.

3. The new sewer will be located away from deteriorated sewers as much as possible.

4. Appropriate allowances, based on experience at the plant site, have been made in the cost estimate for shoring, plant dewatering of soils, and contaminated soil removal.

Use of the new sewer main will reduce environmental risk to Monsanto except during periods when Village discharges are diverted to the new sewer main while repairs are made to the existing Village sewer. The hold harmless provisions of the agreement between Monsanto and the Village should minimize the environmental risk for Monsanto during the periods when Village flows will be diverted to the new sewer.

Monsanto

Capital Appropriation Request

NUMBER: CEA-3808

DATE: June 23, 1983

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ORGANIZATION: MONSANTO INDUSTRIAL CHEMICALS COMPANY

PROJECT TITLE: W. G. KRUMMRICH, MAIN SOUTH TRUNK SEWER

SUPPORTING INFORMATION

A-1175

Monsanto

Capital Appropriation Request

NUMBER: CEA-3808

DATE: June 23, 1983

ORGANIZATION: MONSANTO INDUSTRIAL CHEMICALS COMPANY

PROJECT TITLE: W. G. KRUMMRICH, MAIN SOUTH TRUNK SEWER

CORPORATE STAFF DEPARTMENT REVIEWS

This appropriation request has been reviewed by the appropriate staff departments as indicated below. Staff department comments are included on an exception basis only.

Department	Date Reviewed
E & MM	NA
Finance	5/13/83
Law	5/24/83
Manufacturing Coordination	NA
Marketing Research	NA
Medicine & Environmental Health	5/16/83
Patent	NA
Personnel	NA

HOST COMPANY REVIEW

This appropriation request has been reviewed by the Managing Director of the host company. Comments are included on an exception basis only.

Managing Director _____

CORPORATE ENGINEERING DEPARTMENT SUMMARY

AR NUMBER CEA-3808
DATE June 23, 1983
PAGE 9 OF 10
CEA NUMBER 3808

ORGANIZATION Monsanto Industrial Chemicals Company
PROJECT TITLE Main South Trunk Sewer, Krummrich
CAPITAL $5,000k ESTIMATE ACCURACY ±15 % EST. VALID UNTIL July 1983

APPROPRIATION PROJECT DEFINITION REPORT DATED March 28, 1983
APPROPRIATION ESTIMATE APPROVED AND ISSUED April 6, 1983
STARTUP 22 months after approval
ENERGY STATEMENT DATED March 23, 1983
ENVIRONMENTAL IMPACT STATEMENT DATED August 23, 1982
LOSS PREVENTION, ENVIR. CONTROL & ENERGY REVIEW (DATE) August 8, 1982
PROCESS COMPUTER APPROVED: CED N/A MISD N/A

PROJECT STATUS

All pre-project activities have been completed. Design will begin upon AR approval.

TECHNOLOGY

No new technology is involved.

PROCESS RISKS

Not applicable.

ACCIDENTAL LOSS ESTIMATE PROPERTY DAMAGE $200k
BUSINESS INTERRUPTION $300k

GENERAL COMMENTS This project is vulnerable to increased costs due to poor soils, high ground water and proximity to existing structures. The strategy to minimize cost and control ground water via plant operation and maintenance of dewatering wells is based on a similar successful agreement with the trade unions on CEA 3741, ACL Waste Pretreatment. The same accommodation has been discussed with the unions for this project. Estimated cost and estimate accuracy do not include potential costs for trade union operation of the dewatering wells (as much as $1,000k should we fail to get union agreement).

SIGNATURE [signature] DATE 4/13/83
Director of Engineering (Company)

CER 077445

CE-318 (REV. 12/77)

Monsanto

Capital Appropriation Request

NUMBER: CEA-3808

DATE: June 23, 1983

PAGE 10 OF 10

ORGANIZATION: MONSANTO INDUSTRIAL CHEMICALS COMPANY

PROJECT TITLE: W. G. KRUMMRICH, MAIN SOUTH TRUNK SEWER

Project Definition

Construction will be of extra strength nitrified clay tile encased in reinforced concrete. Joints will be made with Furan resin acid proof cement. Sewer manholes and inlet boxes will be reinforced concrete, fully lined with an acid proof system. Approximately 18 manholes and 12 branch inlet boxes are required.

Parshall flume flow measurement and liquid sampling facilities will be provided near the point of discharge into the Village of Sauget sewer system.

Two cross connections will be provided to allow the Village to divert flows to the new sewer while they repair their own. This also allows Monsanto to use the old Village sewers during emergency repairs. At the conclusion of such work the connection would be plugged off.

Project strategy, to keep soil dewatering costs to a minimum, is based on plant forces being responsible for maintaining ground water levels below the sewer construction elevations.

Pollution and Toxicity

Monitoring of the excavation will be done daily by the plant industrial hygienist to determine if the ground appears to present exposure concerns for the construction people involved. Suitable protective equipment will be provided as judged necessary.

Contaminated excavated earth will be stockpiled for disposal in an appropriate waste landfill. Any necessary permits will be obtained by the plant.

A construction permit for the sewer will not be required from Illinois EPA, based on the project being a replacement of an existing sewer, and representing no increase in sewer load.